

Wind and Water Erosion under Alternate Land Uses: Insights from Ongoing Research at the Santa Rita Experimental Range

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The Importance of Wind Erosion

Wind Erosion

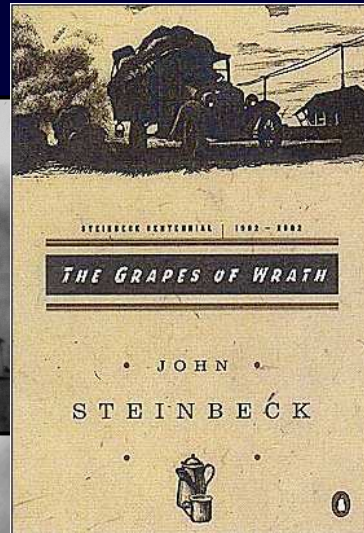


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Wind Erosion



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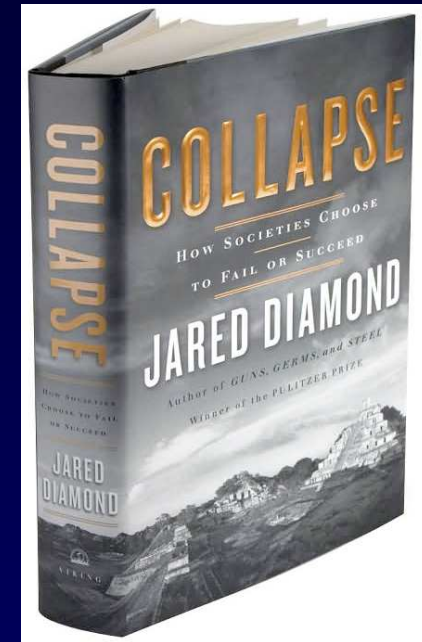
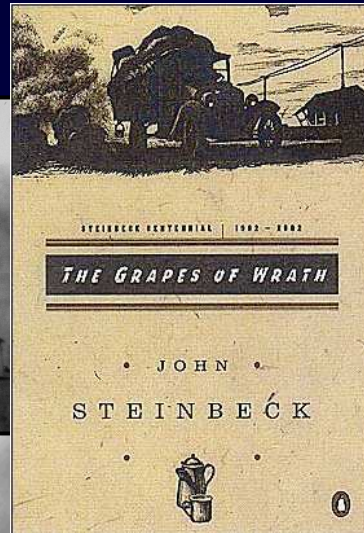


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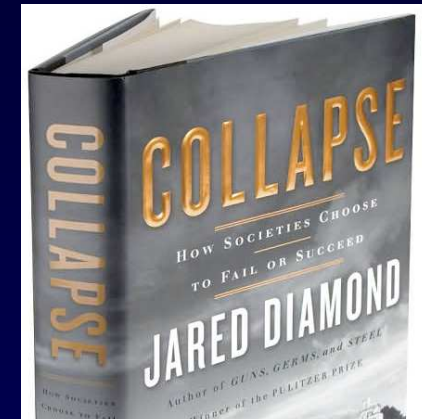
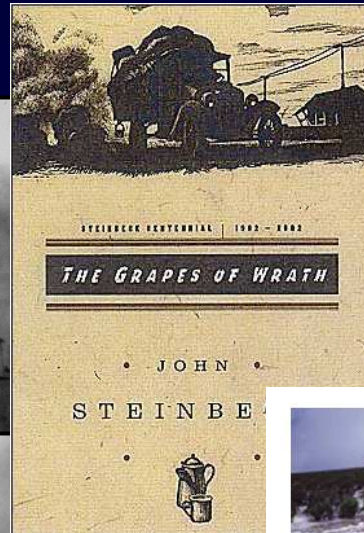


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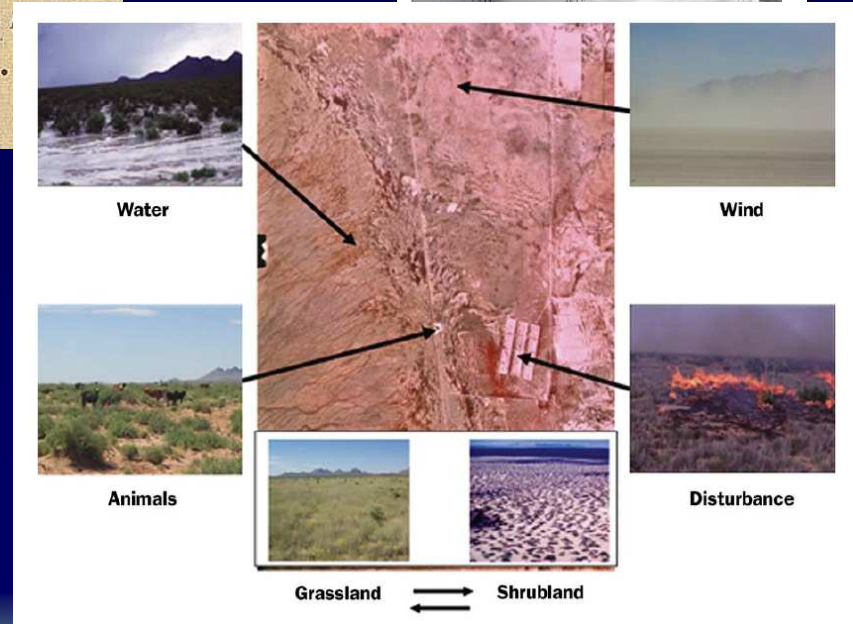


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Peters et al. 2006 BioScience

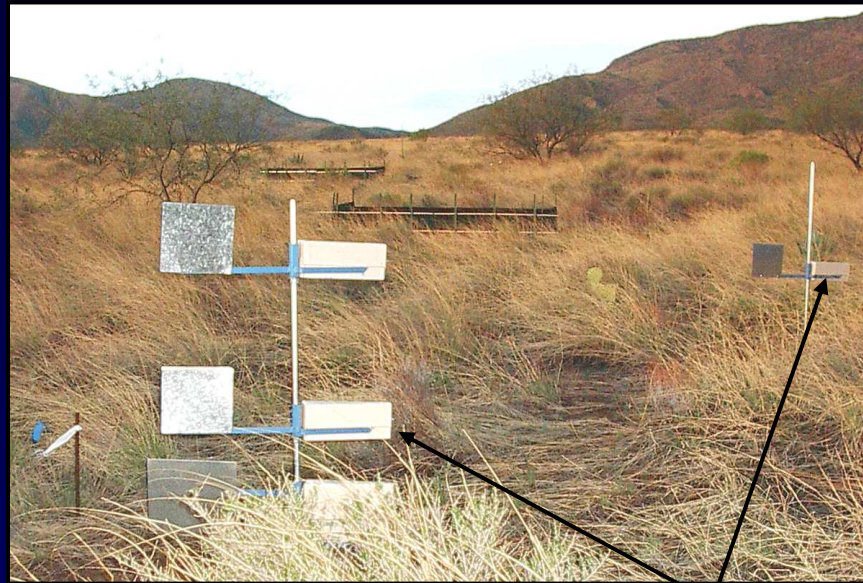
Wind Erosion Study Gaps



Agricultural Barren /
Disturbed Grassland Shrubland Woodland Forest



Measuring Wind Erosion and Transport



Big Spring Number
Eight (BSNE)

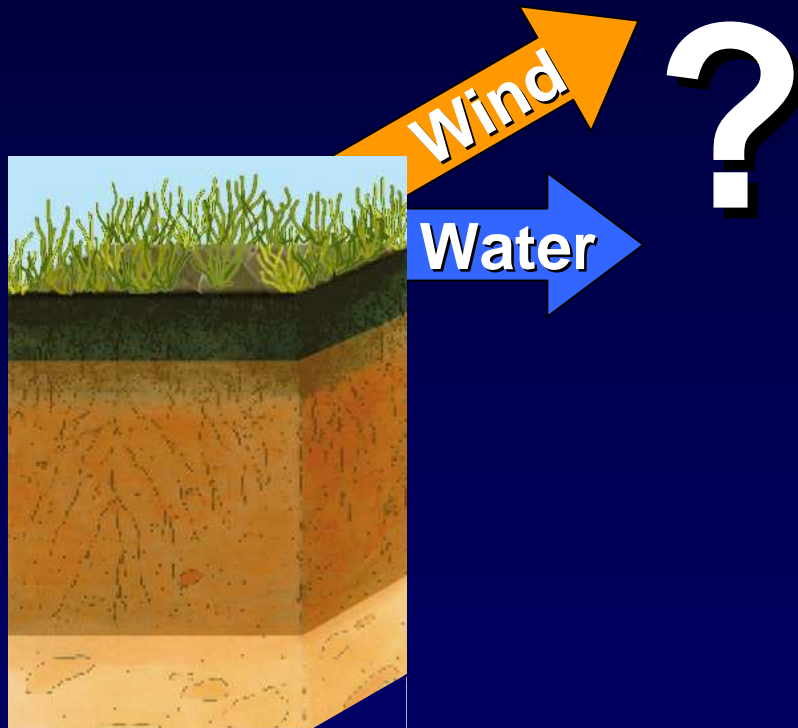
Dust Samplers



Soil Erosion Drivers



WIND vs. WATER Erosion

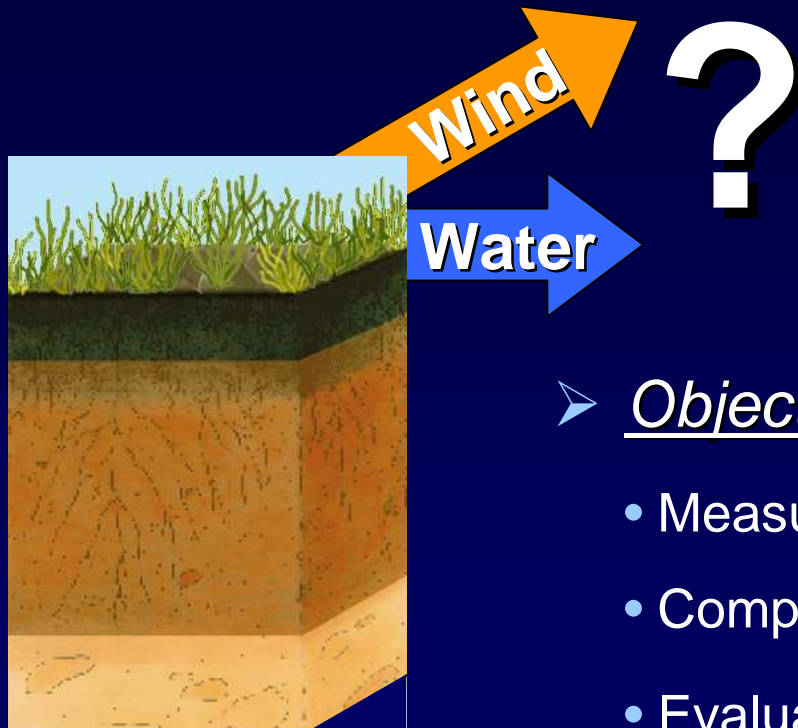


➤ Problems:

- Both contribute to total erosion rates
- No simultaneous field measures
- Relative magnitudes & importance?



WIND vs. WATER Erosion



➤ Problems:

- Both contribute to total erosion rates
- No simultaneous field measures
- Relative magnitudes & importance?

➤ Objectives:

- Measure wind & water erosion simultaneously
- Compare temporal dynamics of both processes
- Evaluate resource redistribution potential



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Ongoing Soil Erosion Debate

Economic Impacts

**Soil Erosion: The Problem Persists
Despite the Billions Spent on It**

Carter (1977)

**The Threat of Soil Erosion to
Long-Term Crop Production**

Larson et al. (1983)

**Environmental and Economic Costs of Soil
Erosion and Conservation Benefits**

Pimentel et al. (1995)

Measurements vs. Models

Science 19 November 1999:
Vol. 286, no. 5444, p. 1477
DOI: 10.1126/science.286.5444.1477c

Rates of Soil Erosion

Pimentel and Skidmore (1999)

POLICY FORUM

LAND USE:

U.S. Soil Erosion Rates--Myth and Reality

Stanley W. Trimble and Pierre Crosson^{*} (2000)

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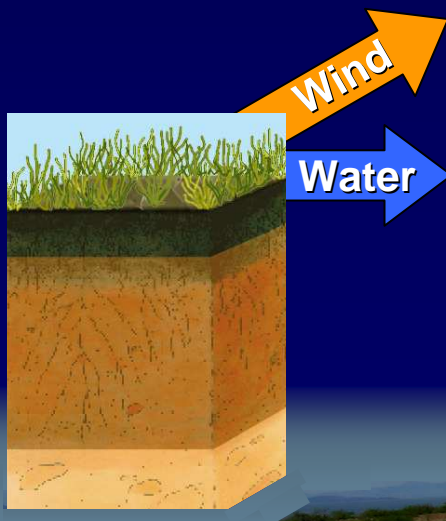
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POLICY FORUM

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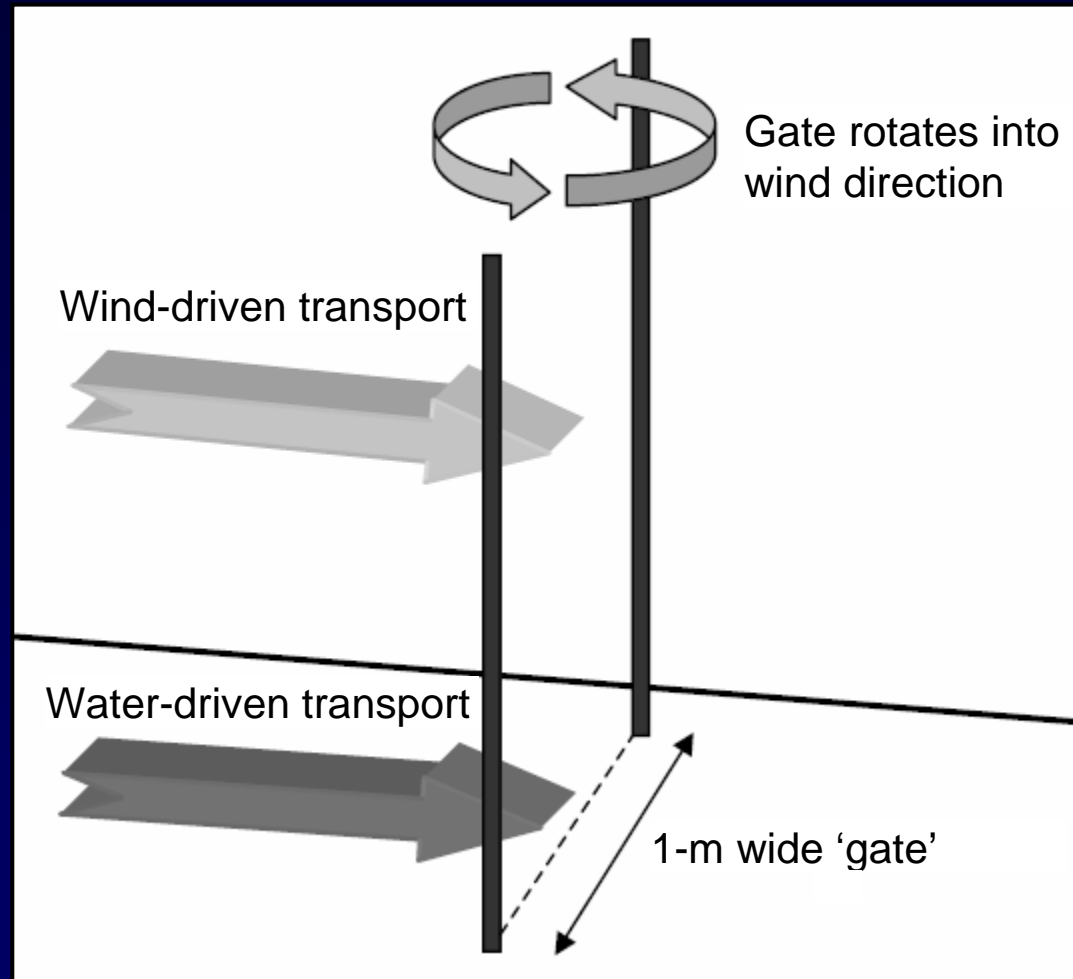
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Wind vs. Water Erosion?

WIND vs. WATER: Conceptual Model



Breshears et al. 2003

Materials and Methods

- Three undisturbed plots (50 x 50 m)
- Each plot contains:
 - Six self-orienting dust samplers
 - A pair of sediment check dams (bordered 3 x 10 m and unbordered)

BSNE samplers



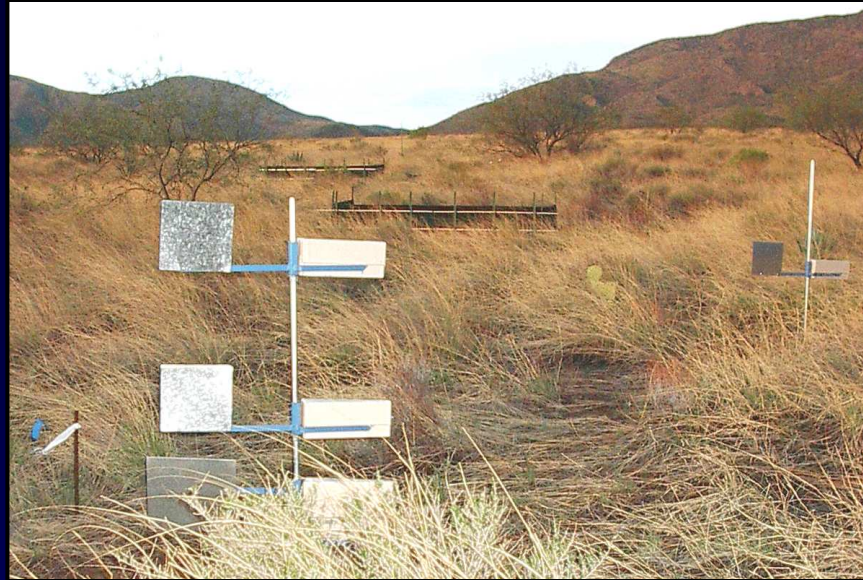
➤ Sediment collection:

- Sample collection every 7–14 days
- Sediment oven-dried at 60°C

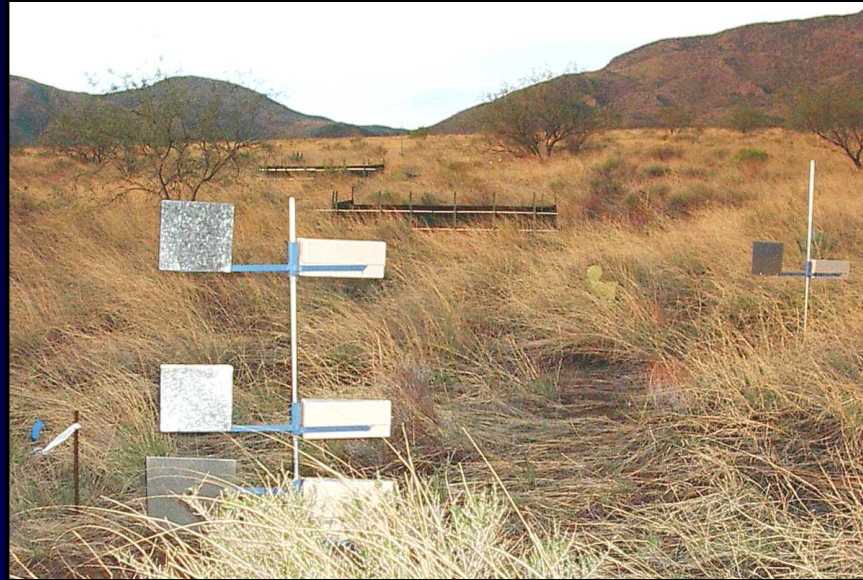


Sediment Check Dam



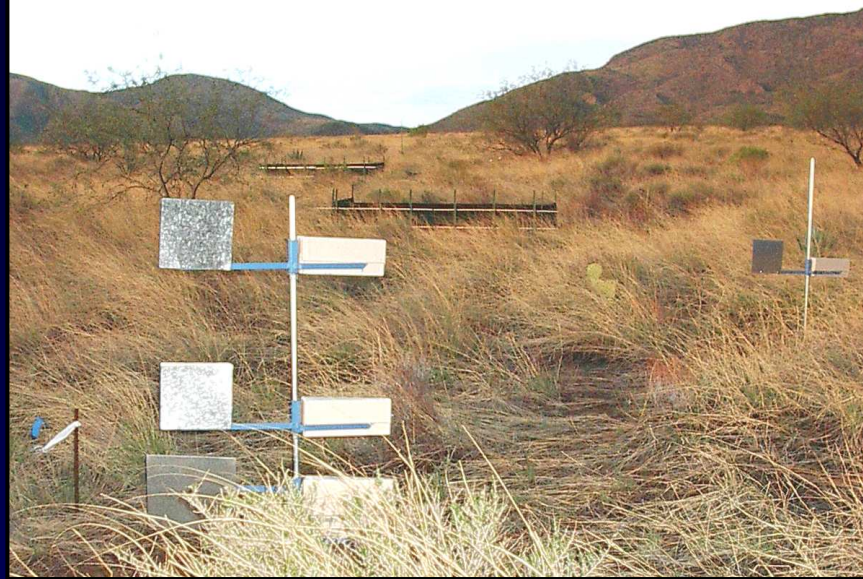


Variation with woody plant cover and percent bare soil



Variation with woody plant cover and percent bare soil

Wind erosion can exceed water erosion



Variation with woody plant cover and percent bare soil

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Ecologically important process?